## Prebiotic chemistry of nucleobase pairing

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Prebiotic chemistry presumably took place before formation of an oxygen rich atmosphere and thus under conditions of intense short wavelength UV irradiation. Therefore the UV photochemical stability of the molecular building blocks of life may have been an important selective factor in determining the eventual chemical makeup of critical biomolecules. To investigate on the role of UV irradiation in base pairing we have studied guanine (G) and cytosine (C) base pairs in the absence of the RNA backbone. We distinguished base pair structures by IR-UV hole-burning spectroscopy as well as by high level correlated *ab initio* calculations. The Watson-Crick structure exhibits broad UV absorption in stark contrast to other GC structures and other base pair structures. This may be explained by a rapid internal conversion that makes this specific base pair arrangement uniquely photochemically stable.